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ABSTRACT

The actions of the mathematics teacher are bound up in ethical decisions that impact the learner and teacher, both within and external to the formal school curriculum. This paper argues that the principles of a radical constructivist theory of knowing underlie a model for an ethics of liberation. A learner's active construction of their experiential reality, including the construction of the independent existence of the other and resulting social implications, frame guidelines for actions that are liberatory. To demonstrate this point, the paper develops the ideas of responsibility of the self, unique directions of learning, and socially-generated disequilibrium. When teachers and their students act according to such guidelines, they are freed to know mathematics and hence themselves in ways that allow them to work toward social justice and democratic ideals. (Contains 21 references.) (Author/YDS)

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An Ethics of Liberation Emerging from a Radical Constructivist Foundation

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An ethics of liberation emerging from a radical constructivist foundation

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The actions of the mathematics teacher are bound up in ethical decisions that impact the learner and teacher, both within and external to the formal school curriculum. In this paper, the authors argue that the principles of a radical constructivist theory of knowing underlie a model for an ethics of liberation. A learner's active construction of their experiential reality, including the construction of the independent existence of the other and resulting social implications, frame guidelines for actions that are liberatory. To demonstrate this point, the authors develop the ideas of responsibility of the self, unique directions of learning, and socially-generated disequilibrium. When teachers and their students act according to such guidelines, they are freed to know mathematics and hence themselves in ways that allow them to work toward social justice and democratic ideals.

Introduction

Ethical issues that arise from the clash between the ideals of democracy and the tenets of capitalism are of increasing global concern. Yet in schools—places where future voting citizens might learn about ethics—practices abound that compromise issues of equity and social justice (Apple, 1992; hooks, 1994; Oakes & Guiton, 1995; Skovsmose, 1994, 2000; Woodrow, 1997) and mask awareness of ethical decisions. We believe that mathematics classrooms are locations within schools where ethics is often least explicitly addressed, and yet examining ethical issues in schools and society has never been more important. The question of how a mathematics teacher addresses ethical issues may be framed in a radical constructivist theory of knowing. Even though this theory has been painted as overly individualistic (Philips, 1995; Lerman, 1996, 2000), we believe that it can form a basis for teachers and students to confront and expand their notions of ethics. In conjunction with this belief, we are responding to Ernst von Glasersfeld's (2000) recent call for the development of a model in the area of ethics. Our purpose in writing this paper is to demonstrate why we believe the assumptions that underlie radical constructivism are assumptions that frame an ethics of liberation.

In the first section of this paper we describe our notions of von Glasersfeld's radical constructivism, ethics, and an ethics of liberation. We then argue that from the principles of radical constructivism emerges an increased awareness of self and reconceptualized awareness of others, i.e. the conditions for an ethics of liberation. We present this argument in three parts, attending to notions of responsibility to self and others, unique directions of learning, and socially-generated disequilibrium. In the final sections of the paper we address potential problems with our argument and consider implications of our ideas for the mathematics classroom. Throughout the paper we use situations from mathematics classrooms to illustrate and illuminate abstractions.

P. Valero & O. Skovsmose (2002) (Eds.). Proceedings of the 3rd International MES Conference. Copenhagen: Centre for Research in Learning Mathematics, pp. 1-13.

Elaboration of key concepts

Our understanding of radical constructivism

Glasersfeld's radical constructivism (1985, 1995) is a theory of knowing. As a first principle of this theory, knowledge is viewed as actively built up by the cognizing subject rather than as passively received. In other words, people are self-organizing systems—cognition serves to make sense of and thus to increase viability in one's experiential world. Furthermore, people's cognitive structures are rational and internally consistent.[1] This assumption opens the way to regarding others as actively engaged in the construction of knowing themselves and their environment.

Second, the function of cognition is adaptive and serves the organization of the person's experiential world, not the discovery of ontological reality. In other words, people's knowing is not an approximation of some pre-existing, singular reality—an approximation that can become "better" by becoming a closer representation of that reality. Instead, a person's knowing serves her organization of her experience, an organization that is ongoing and dynamic. In this organization, a person's knowing can become more viable, i.e., "better", in the sense that it can be modified in the context of interaction. This assumption encourages valuing each person's experiential world as serving that person[2]. As a result, radical constructivism emphasizes acknowledgement and acceptance of many different experiential worlds, since no experiential world can be known to be *the* correct one[3].

These two assumptions lead to another foundational notion of radical constructivism: the restructuring of the concept of objectivity. In social interaction between two people, each person builds a model of the subject of the interaction as well as a model of the other person in the interaction. When input from that second person seems to confirm the knower's model of the subject of the interaction, an agreement appears to be reached—a mutual understanding, a shared knowing. Feedback from the other has a confirming quality that leads the knower to have a certain confidence in her knowing. Glasersfeld calls this knowing intersubjectivity and considers it to be the "highest, most reliable level of experiential reality" (1995, p. 119). This intersubjective knowing is the constructivist's objectivity.

The perceived confirmation of one's knowledge in social interaction plays a crucial role in a person's construction of her experiential reality. By connecting to the ideas of others, people modify, stabilize, and confirm their experiential reality. An awareness of this interplay among knowers allows them to feel "...justified in speaking of 'confirmed facts', of 'society', 'social

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[1] However, an observer might see what she perceives to be inconsistencies or contradictions in another person's cognitive structures.

[2] This stance is not intended to suggest passivity in interaction: as second-order observers we construct second-order models of others and attempt to provoke others into disequilibrium.

[3] However, a radical constructivist does acknowledge that some theories may be more useful than others. That is, one theory is more useful than another if it helps explain situations that the first one explains and explains others as well (Thompson, 2000).

interaction', and 'common knowledge'" (von Glasersfeld, 1995, p. 120). In this process, people further develop their organization of their experience. The reconceptualization of objectivity as intersubjectivity calls for a consideration of others in the construction of each person's experiential reality.

A discussion and definition of ethics

Ethics grow from relationships between people. In fact, without beings other than ourselves in the world, beings that we regard as autonomous and rational, ethics would not necessarily arise. Lewin (2000) speaks of this notion in terms of continuity. That is, if humans did not construct continuous time and space and thereby have the ability to recollect past experience, there would be no need for ethics. The fact that humans do recollect past experience means that relationships between people and objects can be established and change over time.

A common definition for ethics is a code of principles and rules that guides the actions and behavior of members of a group. Thus ethics involves a choice of goals for how to act, and such choices rarely have clearly-defined "answers." When members of a group (such as a group of students and their teacher) agree about these choices to guide behavior, we say that they have reached an intersubjective agreement and their structures for how to act in their community are taken-as-shared. For example, a teacher may have a goal of fostering students' conceptual understanding of multiplication through the use of multiple models. However, she may also have a goal of bringing forth ideas from the students and not imposing her ways of thinking upon the group. In this situation she faces a choice of goals. Her notions of ethics will influence how she proceeds in handling this choice. Furthermore, her understanding of ethics may be compatible or at odds with taken-as-shared understandings in the community—and either situation has ramifications for all members of the community.

Of course, this example is only one of many ethical decisions teachers confront every day. Ethics affects how teachers orchestrate experiences for students in the classroom as well as what information teachers draw from those experiences. It influences how teachers act toward colleagues, administrators, and parents. We believe that a key element of ethical decision making is the extent to which teachers construct others as independent from themselves, a notion we will discuss more fully in the context of an ethics of liberation.

An ethics of liberation

Liberty is a fundamental characteristic of democracy (Glickman, 1998). The term liberation means the setting free from a less free condition[4], a breaking-out from a bound state[5]. Dewey (1938) claims that the only freedom worth securing (and the freedom that education should work to secure) is the freedom

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[4] In contrast, the term freedom implies a more static state because it means not bound or constrained, not being under obligation or necessity. Emancipation may imply a stronger breaking-out because it means to free from oppression or bondage, from any restraint.

[5] "Bound" can be psychological, emotional, or intellectual, not just physical.

of intelligence—a freedom to frame purposes and determine the means to realize them. Both the definition of liberation and Dewey's freedom of intelligence imply an opening up of choices; Dewey's notion also suggests self-determination in making these choices. Choice is freeing because the ability or power to choose involves an internal locus of control, a promotion of self-regulation and self-awareness rather than an automatic requirement to act or think in a certain, perhaps externally-imposed way. However, choosing a direction is both liberating and constraining: once a choice is made, it inevitably influences future choices. We believe that liberation involves the freedom to choose constraints under which to act—a freedom predicated on self-awareness. However, this formulation does not sufficiently characterize an ethics of liberation because it does not elicit an understanding of liberation in the context of interaction between people.

We believe an ethics of liberation is a code of behavior that emerges from each person's need to confer an existence upon others that is independent from her own[6]. This decentering liberates the self because one no longer has the obligation to explain others' behavior; of course, one may still *choose* to create explanations—teachers regularly attempt to do so. Decentering is also liberatory for others because they do not have to conform to or resist someone's expectations of their actions and thoughts. For example, let's say person A has fully embraced the need to confer an existence that is independent from hers on person B. Person A would no longer hold a model of person B in which person B is expected to act and think as person A does. In fact, person A is free to operate from a curious state of wanting to know the dynamic acting and thinking of person B. In turn, person B would no longer be conforming to or resisting the expectations of person A's egocentric model and would be free to fully develop her own actions and thoughts. In addition, person B might consciously choose to consider the impact of person A's observations, actions, and thoughts on person B's growth.

Developing awareness of self and decentering from the self are two crucial, dynamic, and reciprocal aspects of our notion of an ethics of liberation. The more fully self-aware a person becomes, the more she may be able to see her own thoughts in contrast with the independent thoughts and actions of others. As she recognizes others as independent beings, she is engaged in the process of decentering from her self. The more she can decenter (and thereby grow her awareness of others), the more she is able to see and define her own thoughts and actions. Thus characteristics such as questioning and examining assumptions, exploring alternatives, holding conclusions tentatively, and being open to others' ideas (Thompson, 2000) are all part of an ethics of liberation. These activities promote greater awareness of self and facility in decentering from the self.

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[6] Our conception does not dictate a particular code but is intended as a framework for codes of behavior.

In fact, Thompson (2000) argues that radical constructivism predicts the emergence of ethics. That is, by virtue of interactions, groups of autonomous beings will reach intersubjective agreements that will include codes or rules to guide behavior. Thus Thompson posits that a radical constructivist observer would see ethics emerge among groups of people, but would not see any particular ethical system arise.

However, we believe that the model of ethics that emerges from a radical constructivist stance can be further developed. A fundamental problem in ethical philosophy is "the *logical* justification of the basic precept that the subject must adapt his or her own interests to the interests of Other" (von Glasersfeld, 1985, p. 99). For example, what is the rationale for following Kant's (1965) categorical imperative to act only in ways that we wish for others to act? In other words, Kant proposes that we must consider others in our actions. Inherent in radical constructivism is the need to consider others. As discussed, through intersubjectivity one attains greater viability in her experiential world by constructing the knowing of others in interaction. Logically then, this greater viability cannot be obtained without conceptualizing others. Hence, von Glasersfeld (1985) has argued that radical constructivism itself provides the rationale for Kant's imperative of considering others. Radical constructivism, as a theory of knowing that has inherently addressed this fundamental problem, thus provides fertile ground from which a model of ethics should emerge. We claim such an ethics is an ethics of liberation. In this section we examine the characteristics and implications of the principles of radical constructivism to demonstrate how liberatory actions emerge.

Responsibility of self

The first assumption of radical constructivism, that all people are self-organizing systems, implies a subtle personal responsibility for knowing. The responsibility is subtle because it's less something a person consciously chooses and more of a responsibility inherent in the cognitive functioning of humans. In addition, self-organization suggests that the construction of knowledge resides inside the knower but does not preclude others from provoking disequilibrium in the self through the process of learning. Other aspects of this personal responsibility evoked by self-organization are questioning one's knowing and seeking to understand others' cognitive structures. In fulfilling this responsibility, the learner increases the viability of her experiential reality.

It's important to highlight that this responsibility involves one's self as well as others, the subjects of one's experiential reality. Consider a mathematics teacher who is concerned about what actions to take in working with a student. As the teacher develops a hypothetical trajectory for the student's next learning experience, she is strongly pulled to recreate her own mathematical knowing. However, as the teacher fulfills the responsibility of developing a model of the student's knowing that is independent of hers, she acts in a liberatory manner for both herself and the student. The student is free to fully develop his own mathematics rather than be funnelled into knowing the teacher's. The teacher is

free to know the student's thinking fully without needing to make it match hers. In the process, she augments her own understanding of mathematical learning. These actions directly involve the self-awareness and decentering that are part of an ethics of liberation.

Unique direction

The second assumption of radical constructivism, that the function of cognition is adaptive and serves the organization of the person's experiential world rather than the discovery of ontological reality, requires valuation of many different truths, of many different experiential realities. To explain, we first consider a representational view of the world, in which a person's knowing is a "better" or "worse" representation of a singular, pre-existing reality. In this worldview, mathematical truth exists independent of knowers. Those knowers construct their understandings in order to come as close to the mathematical truth—Mathematics with a capital M—as possible. That is, although people may not all follow the same path in coming to know, they ultimately "must" come to know Mathematics. As Larochelle (2000) remarks, this representational view suggests that there are many paths, but they all must lead to Rome. In this view of the world, a person's unique constructions have little meaning or value except as they come closer to representing Mathematics. By not valuing a person's unique mathematical knowing, we believe a person's freedom is curtailed.

On the other hand, a radical constructivist stance means an observer will ask: how is that person's thinking viable in that person's experiential world? Probing how that person is "right" leads to an ethics of liberation because the person's unique path *and* end are valued: people not only move along different routes, but these routes also don't all lead to Rome. Instead of being funnelled into a curriculum that "wants" all people to know Mathematics, each learner develops her path and her knowing of mathematics as fully as possible.

The notion that each person develops her own thinking does not imply separation from communities; others are essential for developing each person's unique direction. For example, fostering the development of students' unique directions in mathematics does not mean each student works in an isolated way. In fact, collaborating to develop taken-as-shared knowledge is essential for each person organizing her experience with a mathematical problem. That is, when groups of students work on a problem, each will be developing her own way of thinking about the problem. But as a student voices her ideas, responses from others (whether confirmatory or contradictory) will allow her to further shape her unique direction. Thus each person's direction is inherently linked with the directions and ideas of others via ongoing work toward intersubjective agreement, or possibly toward disagreement. In this way, the development of each person's unique direction relies on constructing an existence of others independent from the self—our central tenet of an ethics of liberation.

Socially-generated disequilibrium

So then, in a social context, the question arises: what guides actions when another's way of knowing is seemingly incompatible with, different from, or

contradictory to a person who is attempting to construct a model of that other's way of knowing? When involved in such socially-generated disequilibrium, do the guidelines for actions retain a liberatory characteristic? Or does the inability to attain intersubjective agreement necessitate hierarchical valuation of ways of knowing that may not be liberatory?

Ranking another's way of knowing—that is, dismissing another as "wrong" or "naïve," or alternately considering her to be "completely correct" or "perfect"—involves a failure to attempt to understand the experiential world and assumptions of that person, behaviors that are not liberatory. In addition, hierarchical valuation of ways of knowing implies a need to defend and embody a singular view of correctness and so can prevent further learning about one' own knowing as well as the other's.

However, judging the degree of viability of another's way of knowing is an important aspect of the role of a teacher; by entering a student's world and taking on her assumptions as fully as possible, the teacher can point to ways the student operates that the student may not be aware of. Thus, conferring existence on the other provides the basis for liberatory interaction because constructing the other implies constructing *and* valuing the other's way of knowing as an outgrowth of that other person's experiential world. Considering this way of knowing as independent from one's own, i.e. decentering, leads to recasting notions of hierarchical ways of knowing: a person will consider others' ways of knowing not necessarily as better or worse, right or wrong, but as different from her own—different, yet rational and viable in that personal, experientially-derived reality. In so doing, she would operate in such a manner that views equally all people's capability for organizing their experiences, while recognizing that each person's experiences are substantially different. Thus, since this decentering follows from the principles of radical constructivism, two radical constructivists would be interested in judging the viability of each other's knowing within their experiential worlds but would not develop hierarchical valuations of this knowing. These social interactions are liberatory; thus the framework guiding these actions is an ethics of liberation.

In the context of larger-scale interactions within groups, understanding the nature of these liberatory interactions is more complex. The development of a model for the interaction of three people, all of whom hold the assumptions of radical constructivism, can demonstrate the materialization of liberatory ethics. All three people would approach a point of discussion with different experiences, knowledge, interpretations, and conclusions. For example, if they were hypothesizing the zone of potential construction of some student, they may have quite different ideas. They would discuss their observations and conjectures and begin developing some intersubjective agreement, yet some notions would likely remain incompatible. In this incompatibility lies the potential for oppression– either an oppression exerted by the self or a perceived social oppression–if the principles we've set forth for the radical constructivist are not assumed. One of the three may deem her thoughts to be of lesser value than the others' and suppress her contribution. This suppression may negatively impact her self-image if she reorganizes the construction of herself as someone

who has little to contribute. A similar reconstruction of self may happen if she considers her thoughts to be of higher value than those of others. But if she is a radical constructivist, she will act assuming the developing viability of each group member's knowing, including her own.

A social oppression among three people also may unfold with similar consequences when two of the three attain an intersubjective agreement. As radical constructivists, each of the three understands that each person's perspective is rational and internally consistent; hence there would be no hierarchical valuation. Though two people may have attained intersubjective agreement—a seemingly more correct knowing—each understands that the two similar ways of knowing are not isomorphic and there remain three unique directions. Instead of the constraining consequences of hierarchical valuation of ways of knowing, the constraints shaping the operations of the group are liberatory (Steffe, 2000). This recasting of the valuation of others' knowing implies a questioning and examining of assumptions, exploring alternatives, holding conclusions tentatively, and being open to others' ideas—the behaviors of the group of radical constructivists and of an ethics of liberation.

Potential Problems and Areas to be Developed

We now briefly address four potentially problematic areas related to our argument.

First, we realize that other theories of knowing might serve as a basis for a model of ethics that could be characterized as liberatory. For example, a group of representationalists might develop a model of ethics based upon everyone agreeing that their knowing comes to be a representation of a singular reality. In this view, there might be a singular view of ethics but a strong assumption that all people would come to know this view. One could argue that such a model of ethics might be incommensurable with ours—that a conversation comparing the two would not be possible. On the other hand, it is worth asking whether there any particularities about our model that make it more powerful or useful than a representationalists' (or some other) model of ethics. This question calls for further exploration.

Second, in this paper we have focused on the individual and "small" interactions between that individual and one or two others. While we have drawn on the mathematics classroom for some examples, we have not sought to develop the model for a larger community of people who take these notions of an ethics of liberation as shared. That is, we believe further work is needed to explore larger social or communal liberation that might result from our model, both within and outside of schools.

Third, we believe a potential objection to our argument might lie in the realm of our interpretation of liberation and responsibility. That is, we believe that liberation engenders responsibility of self, but we recognize that some might view that responsibility as burdensome. The tendency of some people in the growing global society is to shun the type of responsibility that we believe accompanies liberation and democracy. Avoiding this responsibility can be

attributed to different assumptions about the nature of knowing, we believe such assumptions may constrict freedom.

Finally, we have not argued that students will not or should not know aspects of dominant school mathematics culture (Borba & Skovsmose, 1997; Skovsmose, 1994, 2000). Yet we are aware that our argument emphasizes students' generation of their own mathematics. We've argued no learner can come to know a singular Mathematics because each organizes her experiences uniquely. But in the development of learning communities, certain taken-as-shared mathematical knowledge becomes valued and accepted. Our argument opens the way to consider a broader conception of mathematics in which taken-as-shared mathematical knowledge retains characteristics of school mathematics yet also redefines the subject to include the mathematical thinking of all learners.

Implications for Mathematics Classrooms

While the teacher strives to facilitate students' personal meaning of mathematics, the teacher's own mathematical knowledge will have an impact on students' paths. However, as teachers work to develop mathematical learning, they are simultaneously affecting students' conceptions of what it means to know. As we've argued, beliefs about knowing are intricately linked to beliefs about ethics. In a similar manner, a teacher's beliefs about ethics will affect students' beliefs about ethics. Therefore, a broad implication of our argument is that teachers may more consciously provoke the development of an ethics of liberation in students. This intention will shape the practices of the teacher and the interactions in the classroom.

A second implication is that students may be more likely to develop a greater confidence in their ways of knowing mathematics (Borba & Skovsmose, 1997). So a central question emerges: what mathematics should students learn—is the emphasis to be the child's mathematics or the mathematics of the dominant school culture? These questions influence the numerous decisions the teacher makes in the preparation for and the enaction of instruction. Ethical issues the teacher grapples with include determining to what degree to use an extant curriculum, preparing students for standardized testing or "college mathematics," and meeting the expectations of parents and community.

A third implication when considering a radical constructivist theory of knowing and the emergent liberatory ethics is to look more closely at the role of classroom discourse and the emergence of student voice. We suspect roles of power will unfold quite differently as teacher and learners act, interpret, and interact with a foundation of positioning knowledge as actively constructed (Boaler, 2000). As suggested in the three-person model discussed above, there will continue to be strong pulls towards socially-shared meaning; yet the potential to remain doubtful or possess an alternate view will be more greatly valued and could possibly open paths to greater personal understanding. Ethical decisions are embedded in the orchestration of such an environment. We believe continued work to understand how the ethics that emerges from a radical constructivist theory of knowing shapes teacher decisions, classroom

environments, and the learning of mathematics is a worthy target for those interested in liberatory, democratic classrooms.

Conclusion

Educators concerned with social justice and democratic ideals must develop awareness of personal beliefs about learning and ethics that guide their actions. With these goals in mind, it's useful to explore how the principles underlying the radical constructivist theory of knowing also frame an ethics of liberation. We have argued that because each person actively builds knowledge to organize her experiential reality, interactions with others are guided by an awareness of the responsibility of self, the unique direction of the knower, and socially-generated disequilibrium. Such a code for behaviors is liberatory. Educators with this ethics orchestrate learning environments that will support students in developing self-awareness and the ability to decenter that are necessary for active citizens of a democracy.

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